Chapter 2. The Business Case for Electronic Commerce

FRAMEWORK FOR FUNCTIONAL REQUIREMENTS

In this chapter, we describe a conceptual framework for electronic commerce (EC) implementation, and in that framework, we define those functional requirements that are essential to our vision. To help the reader, we will briefly describe the framework here to provide a context for the more detailed information that follows.

Our vision of a government EC system has four main components: internal agency application systems, a standards-based electronic data interchange (EDI) communications infrastructure, supplier application systems, and a common supplier information data base.

Internal agency application systems consist of procurement support systems and financial systems. The standards-based EDI communications infrastructure consists of ASC X12 standards-based transaction translators and telecommunications services and equipment for storing and forwarding transactions. The supplier applications systems are mirror images of the agency procurement and financial systems. These three components allow business transactions between the government and its trading partners to be exchanged after initial agreements and registration take place.

The fourth component enables the registration of suppliers as trading partners, records common information the supplier must provide to become a trading partner, and allows government agencies to share information about suppliers.

Each of these components and their related requirements are described in more detail later in this report. We do not focus on the details of internal agency or supplier applications. Instead, we concentrate on their interaction through the EDI infrastructure. However, in both the government procurement and financial requirements sections, where opportunities for improved processes exist, recommendations for reengineering have been included.

To provide the reader with a concept of the operation of this system, the following is a simple example of communications between the government and a supplier.

A government buyer receives a requisition for widgets. Not having a source of supply for widgets, the buyer needs to obtain quotes from suppliers. The buyer enters the appropriate information into a procurement support system that creates a request for quotations (RFQ) transaction in the native format of that system. That native transaction is forwarded electronically to an ASC X12 standards-based translator where it is converted into standard format and then is broadcast through the EDI telecommunications infrastructure to the electronic mailboxes of suppliers who sell widgets. A supplier retrieves the contents of the electronic mailboxes periodically and, since the RFQ is in standard format, passes it to a translator to convert it to the native transaction format for the supplier's quotation system. Using that system, the supplier prepares a quote, and the quotation system produces a native format transaction, passes it to a translator, then forwards the standard format transaction through the EDI telecommunication infrastructure to the government buyer's electronic mailbox.

At this stage, the government buyer may have received dozens of quotations, each translated and introduced into the procurement support system. In the next step, the buyer selects an offer, and the procurement system produces a purchase order transaction and sends it through the translator over the EDI infrastructure to the selected supplier's electronic mailbox. The selected supplier retrieves it, translates it, and ships the goods. The supplier's financial system produces an invoice transaction and sends it through the translator over the EDI infrastructure to the electronic mailbox of the government buyer's payment office. The payment office retrieves the invoice, translates it, and introduces the invoice into its payment system.

The key concepts in our example are translation, standards-based transactions, access to the EDI infrastructure, and electronic mailboxes. Obviously, each system, procurement and financial, whether government or supplier owned, must be capable of producing a transaction for each document type in some format. That format must be mapped to standard format by the translator, and at that stage, access to the EDI telecommunications system must be successfully established and maintained until the standard transaction is transmitted to an electronic mailbox.

There can be many variations on this basic theme. The example is not all-inclusive. Payment transactions were not included because electronic funds transfer (EFT) payments use other standards and a different telecommunications infrastructure than that described. However, electronic payments, including invoicing, receiving, and reconciliation processes, are an important part of electronic commerce and are directly linked to the acquisition process. How EDI will assist in the electronic payments enhancement is described later in this report.

ECONOMIC CONSIDERATIONS

Cost can be measured using any number of techniques. However, to assess the actual costs and savings associated with EC, an organization must thoroughly examine internal and external system, personnel, and other associated cost drivers. Economic analysis should address what it costs the government and industry to process an acquisition under the current paper-based, manpower-intensive process and compare these figures to a fully automated process that tracks an acquisition throughout the entire life cycle. The section summarizes some of the economic considerations. However as the technology evolves, and becomes more mature, and as more Federal agencies implement EDI, more information will be available for further economic analysis.

The major areas having a significant cost impact are

- agency system modifications,
- implementation conventions (ICs),
- trading partner registration,
- EC gateway acquisition,
- value-added network (VAN) agreements, and
- network entry point (NEP) capability.

Each Federal department or agency and each vendor must modify its agency system to provide the data necessary to generate EDI transaction sets. The cost of the modifications will vary depending on the agency system architecture. A simple case may require the redirection of a system file, while a complex situation may require the development of an interactive system to access the existing data base.

The Department of Defense (DoD) published its implementation guidelines for EDI in December 1991, and the

General Services Administration (GSA) and the Department of Health and Human Services (HHS) have developed ICs for EDI independently. The ICs developed by these three agencies are not totally compatible and fail to meet the goal of presenting a "single face to industry." To reach this goal, the Federal government must establish central control over all ICs. The National Institute of Standards and Technology (NIST) will facilitate this function.

Trading partner agreements (TPAs) may be standardized at least by industry groups. If the Federal government standardizes TPAs centrally by working with industry groups, Federal departments or agencies may reduce costs by implementing these standard TPAs unless they wish to accommodate their trading partners by making exceptions to the standard TPAs. DoD estimates that it has in excess of 350,000 vendors, all of which require TPAs in order to do business electronically. Without standardized TPAs, DoD will need a millennium to complete negotiations with each potential trading partner, assuming it takes 1 day to negotiate each TPA. Standardizing a single TPA will greatly reduce the time and expense to implement EC.

Each Federal department or agency must incur the full cost of installing and operating one or more EC gateways. These gateways will provide translation to the X12 (EDI) standard conversion format, security, directory, archiving, and communication services. The Defense Information Systems Agency (DISA) is in the process of acquiring EC gateways using commercial off-the-shelf (COTS) hardware and software to the greatest extent possible. Cooperating with DISA may provide other Federal departments and agencies a cost-saving alternative to developing their own.

The Federal Electronic Commerce Acquisition Team (ECAT) is developing VAN agreements for use by the Federal departments and agencies which may be used if they choose to provide their own NEP services. The DISA is presently in the process of establishing VAN agreements with most VANs in which the VANs will connect to DISA's NEPs. If Federal departments and agencies establish reimbursable agreements with DISA to provide NEP services, no additional VAN agreements will be required. If new NEPs are established, they must be linked to DISA's NEPs and all others to provide a "single face to the industry."

POTENTIAL BENEFITS OF EC

From a Federal agency perspective, the idea of EC should be viewed in the context of each agency's mission and functions. Each agency should consider whether the use of EC will

- improve customer satisfaction with the product and service,
- allow the agency to provide the product and service faster,
- allow the agency to provide the product and service at a lower cost, and
- improve business processes.

COST-BENEFIT ANALYSIS

A key determining factor for the method of EC implementation is the tradeoff between the cost and effort required against the benefits expected. Government agencies use formal cost-benefit analyses to quantify this tradeoff. Functional economic analysis, as used within DoD's corporate information management program, has evolved more recently to combine the evaluation of information systems with the effect of business process reengineering. In any case, the economic benefit attributed to EC can vary widely. The benefits are highly dependent upon the degree to which information technology (and EDI specifically) is integrated into a reengineered work flow.

Even though EC is often associated with improved efficiency of operations, cost savings are not the primary reason that most organizations implement the technology. One study found that improved information management and customer service were cited as the most important benefits of EDI. Another study, in which MIS managers of Fortune 1000 firms were interviewed, found that the most common reason for implementing EDI is strong demand by customers. The chief executive officer of a Fortune 100 firm stated that any organization that implements EDI just to save money will not realize the full potential of EDI.

Nevertheless, an economic analysis can be useful for selling EDI implementation internally, selecting an implementation approach from among the alternatives, and estimating EDI implementation costs. A financial analysis is particularly important when EDI implementation is being sold upward within the organization. The proponents will often require a sound business plan to gain support not only for the expenditures involved, but also to

implement desired organization and/or business process changes. The following are benefits often cited when EDI is implemented:

- Dramatically improved responsiveness, i.e., better customer service.
- More information available more quickly for people to be better informed.
- Reduced errors and resultant higher quality/accuracy of information.
- Improved efficiency and reduced costs.

Many areas within the Federal government have identified EDI as a key technology for the future. The November 1991 *Information Resources Management (IRM) Plan of the Federal Government* identifies EDI as a central theme and direction, and includes information that describes how barriers such as security, legal admissibility, and standards are being addressed. The long-range IRM plan for HHS identifies EDI as a critical success factor in achieving the key points of the HHS IRM vision. EDI is, for example, a central element in the revamping of the nation's health care system: it will provide an efficient means to exchange information among HHS, health care providers, insurance companies, and other stakeholders.

When implementing EDI, costs come early while savings come later, and costs are easy to measure while benefits are not. These points often tend to be true with any significant information system implementation, particularly if organization or work flow change accompanies the system. In addition, costs are usually fixed while benefits are variable. Costs associated with design and implementation can be determined early in the implementation process. However, benefits often accrue based upon the number of trading partners and the volume of transactions. Therefore, it is usually more difficult to financially justify EDI if only a few trading partners are used for a limited number of transactions.

There are many examples of calculated financial return described within the EDI industry literature. The examples vary widely primarily based upon the degree to which EDI is implemented in concert with redesign and reengineering of the related business process, together with the scope of how the particular business process affects other business systems and other organizations within the enterprise. A Department of Veterans Affairs (VA) study provided examples of economic benefits realized by some organizations that implemented EDI:

- The VA found that using EDI for delivery orders can save an estimated $75 million over 5 years. The VA also found that implementation of EDI invoices reduces the per invoice costs from $3.48 to $1.55 for a discounted net savings of $12 million (discounted) over 5 years. The use of EDI for government bills of lading (GBLs) would net $388,541 in discounted savings over 5 years; the cost of GBLs would drop from $10.07 to $4.52 each.
- Pacific Telesis (PacTel) eliminated 51 percent of its paper-based systems and lowered its cost per transaction from $78.00 to $.48.
- The Long Island Medical Center reduced its inventory of medical supplies by 25 percent over a 2-year period, while at the same time the number of orders (per year) increased from 22,000 to 35,000.
- The DoD, in its Business Case for Electronic Commerce, identified $1.2 billion in savings by automating 16 most-used forms over a 10-year period. The Defense Management Review Decision 941 identified that $4 million spent in FY92 saved $60 million in FY93. This estimate was considered by many to be extremely conservative.
- The Defense Logistics Agency General Supply Center in Richmond identified $24.5 million in savings with its Paperless Order Processing System (POPS), which eliminated paperwork and reduced inventory and depot costs.
- Texas Instruments implemented EDI in its procurement organization and reengineered its business process, lowering its average cost to process a purchase order from $49.00 to $4.70.
- It costs the Internal Revenue Service an average of $82.00 to process a tax return manually, while it costs an average of $8.75 to process a return electronically.
- The EDI work group convened by HHS in November 1991 concluded that between $4 billion and $10 billion could be saved each year in the administrative costs for the nation's health care system through the use of EDI. The U.S. health care system costs $900 billion, of which $120 billion is for administrative costs.

Given these examples and others, the economic savings can be significant. However, most organizations do not implement EDI exclusively to save money. While they recognize that EDI is an excellent method to contain costs for the future, and even possibly reduce costs in the near term, most organizations implement EDI primarily to enable them to perform their business and mission more effectively.

In order for any agency to determine its range of economic savings, an agency-level analysis will be required. In most cases, agencies must reengineer the procurement processes to obtain optimum savings. There are two requirements for cost-benefit analysis: near-term analysis without reengineering and long-term analysis with reengineering. Full implementation of EDI may not be cost effective until reengineering of the processes is completed. For the near term, agencies are to select those opportunities to implement EDI which indicate a clear cost savings. This two-tier approach will allow agencies to benefit from near-term cost savings while developing the long-term solution.

PROCUREMENT

The mission of the National Performance Review (NPR) is to make the Federal government work better and cost less. The Federal government awards $200 billion in contracts every year, and many of the processes it uses to award those contracts are labor intensive and governed by burdensome, outdated regulations. Procurement was cited as a prime target of the NPR because of the huge potential for savings, and EC will contribute a significant portion of those savings.

WHY IMPLEMENT ELECTRONIC COMMERCE?

EC is revolutionizing the way business is conducted. Electronic mail, EDI, EFT, and the other computer-based technologies increase productivity by lowering costs, reducing lead times, and improving communication time. The private sector has long recognized the benefits of EC and has moved ahead of the Federal government. The Federal sector must now create an environment that takes advantage of EC technology.

The huge benefits that computer-based technologies provide are impelling their development and implementation throughout the world. Because benefits accrue on both sides of any EC transaction, the government must promote implementation throughout the business process. With this in mind, the Office of Federal Procurement Policy (OFPP) chartered the ECAT to develop a means for the Federal government to use these technologies to the benefit of all entities involved.

The standardization of EC architecture presents a great opportunity to re-engineer an agency's procurement system. That is, the submission and processing of requisitions, the issuance of RFQs, the evaluation of quotations, and the tendering of an offer all

must be looked at in a new light and streamlined to take advantage of EC.

Commodity small purchases is an area in which substantial and immediate benefits will result from the use of EC. These buys, all under $25,000, are a large percentage of the workload in every buying office. Automating them, from the preparation of the requisition through payment to the supplier, would allow the buying office to perform them more efficiently, and, in turn, would provide procurement offices more flexibility to complete their missions.

From a small business perspective, new opportunities exist when the business can access the pool of government RFQs, suitably filtered to present only those requests that are of interest to them, to respond in a quick and convenient way, and to do this at a cost that is less than today's paper-oriented process. The adoption of EC techniques is not without its costs, but as long as they are less than current methods, business, especially small business, the government, indeed the nation's economy, is healthier.

EC is an enabling tool. So that it can be used, process and system changes must be made. It is not enough merely to automate the present paper-based systems; that action would not take advantage of the efficiencies available in an EC environment. Both parties to the EC transaction, the sender and receiver, must reexamine the way they conduct business.

On the Federal side, the system redevelopment should include an automated procurement system linked to automated financial and automated supply systems. It is critical that process redesign encompass the full range of procurement and financial dealings with the supplier community to achieve the maximum benefits of EC.

An agency procurement system should be easy to use, allow automated approval processes, and provide access to on-line catalogs and data bases. The system should be totally integrated in the EC environment.

Using this EC system, the buyer would electronically distribute an RFQ, either nationwide or to select offerors, depending on the type of buy. This increased distribution would open up procurement opportunities to firms all over the country. Small purchases will continue to be reserved for small businesses. Suppliers would respond electronically. The agency system would

rank the quotations according to price and provide them to the buyer. Based on the full range of buying criteria, the buyer would make a decision. When the selection is made, a purchase order would be automatically created and sent to the winning supplier. A broadcast notice announcing the winning supplier would be generated.

Receipt of the item, either in a central location or at the final site, would be recorded in an automated supply system. That system would electronically notify the financial system where receipt of the goods would be matched with the purchase order. If they match, the supplier would be paid electronically. No invoice would be needed since the agency would know what it ordered and what it received.

Other features of an EC system that benefit the government would include on-line catalogs, shared procurement and supplier information data bases, the ability to quickly and more accurately move data—e.g., Federal Procurement Data System (FPDS) information—between agencies and, through electronically stored information, the chance to free up work space by eliminating file cabinets.

How Does the Government Benefit?

The following subsections discuss how using EC in the acquisition process benefits the government.

Increased Buyer Productivity

The electronic movement and processing of procurement data results in more efficient execution of purchase orders. *It would eliminate* many functions, such as reproduction, mailing, handling, repetitive data entry, and telephoning. With an EC system, buyers can better manage their resources by eliminating time consuming tasks. Therefore, buyers become more professional and can use the opportunities the technology offers.

Since EC will permit the buyer to solicit, receive, and analyze quotations, issue orders and notices of award, and distribute the orders without creating a document on paper, the procurement process will be faster. As internal systems are created or re-engineered to permit a requisition to be received electronically and award information transmitted in the same manner at the same

time, the entire procurement process will become faster, more efficient, and more responsive.

Full implementation of EC will reduce the number of times the same data are entered into a record or "file." Paper handling and filing time at multiple locations and time spent making photocopies will also be reduced. By reducing the processing time for individual orders, EC will produce a secondary benefit—faster delivery to the customer.

Yet another benefit of EC is the reduced transaction cost, which frees funds for front-line operations of an agency.

Lower Prices

As more offerors are given the opportunity to do business with the government, the competition to supply the government's needs will increase. That increase in competition among suppliers will result in lower prices. The price reduction achieved will be most dramatic immediately following implementation of an EC program, and then, the savings will level off. The competition will help prevent price gouging and other noneconomic reasons for price increases.

Expanded Supplier Base for Increased Competition

The global dissemination of procurement opportunities will result in more suppliers vying for government business. That increased competition will initially reduce the price per item ordered. The price reduction achieved as competition within the EC system increases as the pricing stabilizes. As the EC system matures, best-value procurements can result in higher quality suppliers and higher quality products.

Better Management Information

Producing and moving data electronically can greatly enhance management of those data. With EC, specific transactions can be tracked from registration to receipt. Further, control during internal processing is enhanced with reliable status information, flexible reporting options, and acquisition, financial, and inventory planning.

Increasing Small and Small Disadvantaged Supplier Opportunities

The EC process will increase the total number of suppliers doing business with the government. Therefore, the economic benefits of government procurement will flow to more diverse supplier and geographic bases. The dollars spent in government operations will increase the economic base of businesses. Even more, the resulting new business, or at least new business opportunities, will stimulate sectors of the economy not previously affected by government procurement.

Reduced Processing Time

In large part, because the time it takes to move the data between the parties involved is reduced significantly, EC reduces the processing time for the award and delivery of goods. Many of the benefits of electronic processing realized by the buyer are also realized by the seller. These all combine to reduce the entire procurement cycle significantly.

Better Inventory Control

The ability to employ "just-in-time" inventory techniques, promote direct delivery, use existing distribution channels, speed the internal order process, reduce mail time, and eliminate paper-based process delays will result in better managed and controlled inventories, if not reduced inventories.

Just-In-Time Inventories

Just-in-time is a cost-saving technique developed by manufacturers to reduce inventory and operating capital requirements. Companies use EC-supplied information to track inventory to assure that it arrives "just-in-time" for the manufacturing process. This same technique can apply to government stock levels. Because of the efficiencies of EC, smaller, more frequent orders will result in the same competitive pricing achieved through large guaranteed contracts. This technique promises the greatest benefits for agencies that require substantial inventory levels of numerous items to meet their missions. Ultimately, some agencies would automate inventory management so that replenishments are ordered electronically as needed.

Improved Payment Process

EC provides quick, easy, and accurate payment with reduced or eliminated late payment charges based on the terms of the purchase order or contract. EC enhances the use of EFT to better manage Federal cash balances, provides electronic matching of receiving information to purchase order information thus reducing invoice processing time or eliminating the need for an invoice, and ensures the opportunity to take discounts when advantageous to the government. The government can negotiate lower prices based on its ability to pay faster.

Availability of Catalogs and Government-wide Contracts

The use of electronic catalogs and government contracts available to all agencies would enhance competition and provide lower prices. Interested suppliers would provide an electronic catalog to the government, which would eliminate the need for paper-based catalogs in each office. The government could review those catalogs for the most favorable price and terms and place an order electronically. That approach would provide the government ready access to potential sources of supply and would allow it to bypass the RFQ process in favor of comparison shopping through electronic price catalogs, thereby reducing the cost of the procurement process and achieving best-value products.

How Do Suppliers Benefit?

Many of the benefits realized on one side of an EC partnership are found on the other as well. In addition, suppliers may use EC in conjunction with trading with both the Federal government and their suppliers. Suppliers should also be poised to take full advantage of the benefits of EC throughout their internal organization when exchanging company-wide information.

In relation to the benefits accrued on the Federal side, the following subsections outline some of those that can be found on the supplier side.

Increased Operating Efficiencies

In much the same way that EC makes the government buyer more productive, it allows the suppliers to operate more efficiently. The manual functions involved with the processing of paperwork are eliminated. This speeds the process and virtually eliminates the errors inherent in keying and rekeying data. Quotations, order

processing, and financial systems can all be automated to allow for greater control, reduced costs, and improved processes. By lowering the cost of finding and bidding on government requests, more businesses are expected to participate.

Increased Opportunity for Government Procurements

The use of EC gives all suppliers an equal opportunity to supply the requirements of all government offices. It allows businesses to compete, on a global scale, for government contracts. The EC system provides a uniform network architecture used by all government offices. Thus, suppliers respond to requirements in the same method regardless of the procuring office. By lowering the cost of finding and bidding on government requests, more businesses are expected to participate.

Improved Payment Process

The EC system will expand EFT payments, resulting in quicker, error-free transmission of funds. It will process the invoice faster and in the future may eliminate the invoice all together.

Leveling of the Playing Field

Regardless of business size and geographic location, all suppliers will have instant and equal access to the government's requirements.

Reduced Direct Costs

The EC process will reduce the amount of time and resources used in handling paper documents, managing the operation of a paper-based system, keying and rekeying data to information systems, paying postage, maintaining stocks of supplies and storage systems for paper products, and maintaining a manual audit trail for transaction reconciliation.

Better Problem Resolution

EDI minimizes the time spent identifying and resolving inter-business problems. Many problems come from data-entry errors somewhere along the way, and EDI eliminates this situation.

Invoice Elimination

Business reengineering using EDI procedures allows for streamlined processing by using "receiving reports." The receiving report makes the invoice obsolete and eliminates much of the effort now devoted to acquiring, receiving, and paying for goods and services. Companies could be paid by a receiving system through which award acknowledgments and receiving reports provide all the data necessary for payment.

Improved Cash Flow/Cash Management

EC can be used to improve vendor cash flow by reducing lags in government payment times and increased accuracy in payment and account data. The government also benefits from better controls and improved error resolution in the event of disputes.

PROCUREMENT FUNCTIONAL REQUIREMENTS

Today, doing business with the government means dealing with numerous buying offices in agencies. Sales representatives must be familiar with how each agency does business, points of contact at each location, and business strategy for each agency. This variety makes the cost of doing business with the government extremely high, often too high for small businesses.

For electronic commerce to provide efficiencies for both industry and the government, the ability to present a "single face to industry" (single registration, one-stop shopping for RFQs, identical transaction formats, etc.) and for the government to present a "single face to industry" (identical transactions, clauses, and forms, etc.) is essential.

Figure 2-1 illustrates the basic data flows experienced in a typical electronic procurement operation described as follows:

- One of the first actions a procurement office takes upon receipt of a purchase request of $25,000 or less is to determine whether the requirement can be met through an existing contract, either a current agency contract or other contracts, such as General Services Administration's Federal Supply Schedules and information resource management (IRM) schedules.
- Purchase requests that can be satisfied through existing contracts are relatively fast and easy to complete. Most often, a delivery order is issued.

- If an existing contract cannot be used, small purchase procedures are used. Figure 2-1 identifies the data flow of a small purchase.
- Items on purchase requests for under $2,500 may be acquired using a government bankcard. That method is an extremely easy and efficient way to purchase small dollar items.
- Actions between $2,500 and $25,000 have the highest potential for EDI processing and savings. The processing of these purchase requests, generation of an RFQ, receipt of a quotation from the supplier, and the award of a purchase order are all done electronically.

Once an order is received by a trading partner, whether it is a delivery order, bankcard purchase, or purchase order, the data flow becomes uniform.

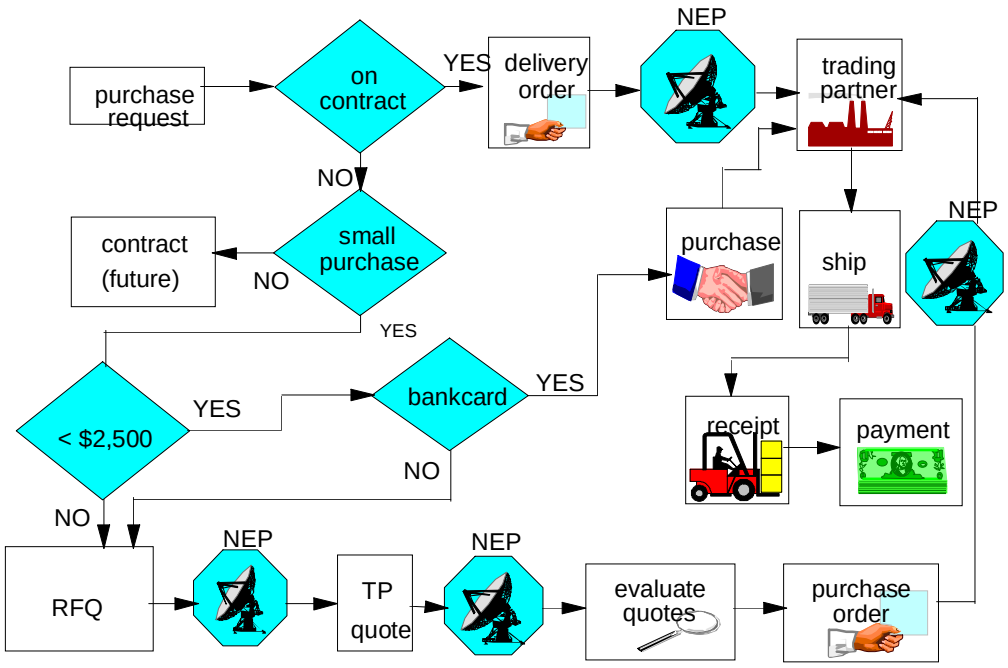

Figure 2-1. Procurement Data Flow

When considering these typical flows and evaluating the needs of the procurement community, we identified a series of functional requirements that must be satisfied when designing, developing, and planning the implementation of the Federal EC acquisition system.

Multiple Identification of a Single Supplier

Many suppliers that do business with the government use regional and local sales offices to respond to RFQs. Besides the geographic differences, organizational structures within corporations must also be recognized. While one office in a corporation may provide quotes on the sale of widgets, another office may be responsible for quoting maintenance for those widgets. Each office may require a unique supplier identification number.

The EC system must allow companies to obtain as many identification numbers as needed for internal purposes.

Financial Requirements

Each procurement request is routed through a financial/budget officer who verifies and certifies that funds are available for that particular requirement. Upon delivery, the supplier submits an invoice or voucher for payment.

The EC system must be able to receive invoice information from the supplier electronically; verify receipt of goods, services, deliverables, or reporting requirements; and electronically transfer funds to the supplier, or its financial institution or other assignee.

Common Numbering

Currently agencies have various supplier identification numbers and stock numbers for commonly used products. As a result, sharing supplier data among agencies and matching against common catalogs is difficult, if not impossible.

Unique, common supplier identification numbers are necessary to successful implementation of electronic commerce. The government should establish numbers for common stock numbers, and an item description data base.

Distribution Capabilities

Procurement transactions must be distributed in several different manners to differing entities. The first is a one-to-one relationship (order, sole-source RFQ, remittance data, etc.) in which the agency sends one transaction to one party. The second is a one-to-all relationship in which the agency sends one transaction to all interested parties. The third is one-to-specific distribution in

which an agency sends the same transaction to several but not all entities. The final method of distribution is to post transactions (Notice of Award) for any interested party to review.

In addition, an agency must send and receive information and transactions from other government agencies in a fashion similar to those as described above.

The EC architecture must allow all types of transactions to be sent and received as defined above.

Transmission Requirements/Translation

The basic requirement is the transmission of data between an agency and another organization through the EC system. As part of the transmission, the procurement community needs a hierarchy of traffic to allow for expeditious transmission of priority transactions. Agencies will be able to transmit and receive ASC X12 standard transactions.

The EC system must differentiate between priority and routine transmissions and provide them to trading partners shortly after receipt at the EC system. The agency is responsible for transmitting the transaction to the EC system in a timely manner.

Date and Time Stamp

The integrity of the competitive procurement process requires that the government use a common date and time to identify the receipt of a transaction.

Receipt of a transaction at the first government-controlled EC system constitutes possession by the government.

Notice of Award

When a contract is awarded, the agencies must notify all suppliers that submitted offers. The notice includes the name of the winning contractor, date of award, and amount of the contract. Notices of awards exceeding $25,000 and all awards with subcontracting opportunities must be published in the *Commerce Business Daily*.

The EC system must have the capability to “post” award information. When an agency transmits an award through the EC

system, the system will extract the following information: awarding agency, quotation number; order number, name of awardee, city location, delivery date, unit price(s), and total price of order. The information will be posted for 7 calendar days.

Single Registration for Total Access

Ease of use and access to all data are essential to successful implementation of EDI in the Federal procurement process. The EC system must not limit the availability of data on a regional or geographic basis. Once an agency transmits an action, the data must be available throughout the EC system.

Any value-added network that will access the EC system with the intent to sell or resell the data must agree to accept all data sent and make those data available in its system.

Hours of Operation

The EC system must process transactions when they are needed by agency personnel. Factors that affect the "standard" workday include the global economy, flex time, compressed work schedules, and telecommuting. Continuous system access and the ability to send information at any time of the day requires changes in the hours that agency personnel work. No longer is it acceptable to have a system available only between 8:00 a.m. and 5:00 p.m. EST; today's worker demands instant access, regardless of the time of day.

The EC system must also accommodate the peaks and valleys of the Federal procurement system. The stream of traffic within the system is not constant; increases in usage can be expected at certain points in the fiscal year.

Because the EC system will be used by procurement offices at installations around the world, the system must be operational 24 hours a day, 7 days a week.

Processing Requirements

The EC system will accept transactions in ASC X12 format. As agencies redesign their procurement systems, they will switch to real-time processing of transactions although they may need some batch processing.

The EC system must be able to process large batches of transactions and individual transactions as they are produced.

Minimum Data

In an EC relationship, each party pays for the movement and storage of data. The fewer data that must be sent, the lower the cost to both parties to move those data. One method for reducing data volume is to replace the data with codes, a technique that is used quite often in computer systems since it allows large amounts of data to be stored in a small area. Since much of the data flow between partners in an EC relationship is repetitive (i.e., shipping and billing to addressees), the process easily lends itself to the use of codes. The computers on both ends of the partnership can convert these codes to the text address when needed.

Whenever possible, transmitted text fields should be replaced with coded data. The agency systems must convert those codes to clear text. Much of the data needed for the code conversions can be updated from the shared data bases stored on the EC system.

Additional Data Transmission Needs

There will always be a need for moving more than just simple transactions between trading partners. The additional types of data include, E-mail messages, extended text (as in a long statement of work), graphics and drawings, contract clauses, and representations and certifications. The movement of that information is necessary for full electronic commerce between trading partners.

As a minimum, the system must send and receive e-mail messages in the first phase of implementation. That procedure allows communication between trading partners. As the system grows beyond simple commodity purchases, other types of data must be moved. E-mail messages must not be allowed to substitute for defined transaction sets.

Message Confirmation

Procurement officials must verify the reception of various transmissions. Many methods are available to ensure receipt of a message, including both technical methods and business-related methods.

EC systems must match ASC X12 functional acknowledgments with the appropriate outbound message. Additionally, for business reasons, the trading partners should establish guidelines for the transmission of business acknowledgments.

Security

The EC environment must secure, or ensure the security of, certain messages. Initially, this requirement will most often apply to securing incoming bids until the designated bid opening time. Later, technical and proprietary business data will need to be safeguarded. Another area of concern is ensuring that the information sent is the information received.

Common data bases also have security requirements peculiar to each data base.

The EC system must process and pass transactions in a secure manner. The agency systems must provide equivalent levels of security for electronic submissions as they provide for paper.

Help Desk Assistance

The maintenance and operation of any significant system requires the availability of user assistance for training, assistance, and providing a “single face” image.

The EC system must contain one or more ”help desks” that can be reached electronically or by telephone. The desk must function for buyers and sellers. For sellers it must provide information on network access and trading partner registration. For buyers it must provide information on common data bases such as supplier registration.

Transportation Costs

The cost of transporting the goods ordered by the government is either “included” in the price or shown as a separate item on the order. When the cost of shipping is shown as a separate item, it is generally an estimate used essentially as a method of obligating funds to facilitate payment.

To facilitate payment, the government implementation convention for the RFQ and order must require that costs be presented on the same basis.

Common or Shared Functions

Data commonly used by all agencies should be available through the EC system to facilitate the reengineering of agency systems. Under this concept, the cognizant agency maintains and updates the data and provides it to other agencies. The common files and data bases described in the following subsections would benefit EC.

Master Solicitation/Contract Document Package

The Federal Acquisition Regulation (FAR) contains more than 500 provisions and clauses for various types of transactions. While some provisions are permissive, many are mandatory.

Agency regulations [e.g., the Health and Human Services Acquisition Regulations (HHSAR)] and other Federal regulations [e.g., the Federal Information Resources Management Regulations (FIRMR)] add numerous additional provisions and clauses

The FAR provides uniform instructions for agencies on the placement of the provisions and clauses in RFQs, solicitations and contracts. It spells out whether they must be provided in full text or referenced, and whether they are required, required-when-applicable, or optional. The FAR presents this information and identifies it in the form of 18 matrixes. Federal agencies generally use the same FAR provisions and clauses according to the various prescriptions for their use.

The EC system should allow for the selection of provisions and clauses as well as easy access to the text of these various provisions and clauses.

For small purchases, the FAR matrix lists more than 250 provisions and clauses. Currently, many agencies use the Optional Form 347 (OF-347), *Order for Supplies or Services*, as the award document. The OF-347 contains 17 provisions/clauses, all of which are identified in the FAR matrix as applicable to small purchases.

The OF-347 also collects supplier information, such as business classification, on several different documents. For example,

business classification is also collected on the representations and certifications (Section K of a solicitation), the SF 129, *Solicitation Mailing List Application*, and the Small Business Administration's Procurement Automated Source System (PASS). Supplier registration within the EC system will collect supplier-specific data on a one-time basis, or annual recertification of representations and certifications. When a supplier registers, that information would be provided and, therefore, capturing this information again and again would not be necessary.

Most agencies use some type of automated solicitation/contract preparation package to generate transactions above the small purchase limitation. Once the type of contract and certain other parameters are identified, those software packages automatically incorporate all required provisions/clauses and allow for the selection of the other optional provisions and clauses according to the matrix. In addition, agency-specific provisions and clauses are merged into the FAR matrices and automatically made available. These systems also give the buyer on-line access to the provision/clause prescription and the full text of regulation.

Establishing government-wide master solicitation/contract packages for small purchases and other contracts or purposes is a top priority in the EC system. These master packages would be established for the various types of contracts and/or purpose (i.e., fixed-price supply) and be housed in, and accessed on, a separate data base on the EC system. Each master solicitation/contract package would have an identifying number, such as Master Solicitation Package No. 1 (MS-1) for a fixed-price supply. When a package is changed, a revision code or date would be added to the basic number. An EC transaction would cite the package number rather than transmitting each provision/clause over the network. This procedure will eliminate the need to transmit the same information time and time again as well as the need to transfer sets of "full text" documents.

A supplier who needs to know what provisions and clauses a master solicitation document contains would access the EC system, enter the package and revision number, review, and if desired, download the information. Like buyers and contract specialists, the supplier could also access the prescriptions and regulations associated with the provisions and clauses.

Supplier Data Base

The supplier data base provides for one-time entry of the information needed on most, if not all, procurements. It includes

business size, socioeconomic status, name, company address, etc. It also provides for one-time submission and annual recertification of FAR representations and certifications required. Use of this data base will save time for the suppliers and the government.

Suppliers must enter all data with their initial registration and update information (e.g., address and socioeconomic status) as it changes. Updated supplier information should be promptly entered on receipt to ensure the availability of accurate information in a reasonable time. (A goal of 24-hour availability for accurate and complete information is desirable.) New supplier registration should also be promptly "on-line." Supplier quotations must interface with the supplier profile data base to provide the necessary data to procurement offices. Procurement offices must be able to query the data base on an ad-hoc basis.

Common Data Bases

A number of documents are used by most, if not all, the procurement offices. The following are some examples:

- Department of Labor wage determinations
- List of Parties Excluded from Federal Procurement and Nonprocurement Programs
- Trading partner agreements
- Indirect cost agreements
- FAR/FIRMR
- Master government contracts.

These documents could easily be developed and made accessible in an electronic format to any interested entity within security guidelines. Responsibility for each existing data base should remain with the agency currently charged with that responsibility. For example, the List of Parties Excluded from Federal Procurement and Nonprocurement Programs would continue to be maintained by GSA with access through the EC system. When a supplier submits a quotation, the system would query the list to determine whether that particular supplier is listed. If the supplier is listed, a message would be sent alerting the buyer. Ad-hoc access would also be available to government personnel.

Statistical Procurement Data Reporting

Public Law 93-400 required that OFPP establish a system for collecting, developing, and disseminating Federal procurement data that would meet the needs of congress, the executive branch, and the public sector. These data are used for geographical analysis, market analysis, and analysis of the impact of congressional and Presidential initiatives in socioeconomic areas such as small business. The data are also used to measure the impact of full and open competition in the acquisition process and are a reliable basis for measuring and assessing the impact of Federal acquisition policy and management improvement initiatives.

The Federal Procurement Data Center (FPDC) in GSA operates the Federal Procurement Data System (FPDS) for OFPP. The FPDC has issued the *Federal Procurement Data System Reporting Manual*, which establishes the guidelines and instructions, including ADP transmission instructions, for data collection.

Data are collected and reported on a quarterly and annual basis. A maximum of nine reports is required when reporting data to the FPDS, and approximately 70 agencies report data to it.

Data on awards with an anticipated value of $25,000 or less, are reported in summary for total actions and dollars as well as detailed line item entries.

Contract actions for awards (contracts, delivery orders, orders against basic ordering agreements, etc.) with an anticipated award value of more than $25,000, including modifications to those awards regardless of dollar amount, are reported much more extensively by collecting approximately 80 data elements on each transaction.

Data may be entered as alphabetic, numeric, or alphanumeric, ranging from one position to many (for example, 30 positions for the contractor's name), with various options for selections within the different items. In addition, several edits have been established to cross-check correlation between data and to verify the validity of entry information.

These data elements as well as the feature for identifying the data may change from time to time (e.g., the addition of data elements for special projects such as the emerging small business program, or from a "Y" or "N" response to a "1" or "2" response).

Each executive agency shall maintain for a period of 5 years, by fiscal year, a record containing unclassified records of all procurements exceeding $25,000.

The EC system should be designed to capture much of this summary and detailed information during the transmission of the transaction sets across the system. For example, suppliers are registered in a supplier data base along with the size standard. As the system transmits an award to a supplier, the supplier's address will identify it and the EC system will be able to capture the action and the size standard. The EC system would not be able to determine other types of information such as whether or not the action is to be captured as a tariff or regulated acquisition. This information would have to be entered in another manner.

The EC system must meet the specific data requirements for collection and dissemination, and produce statistical data upon demand. It must also allow for those agencies or other components who need the information to have access to the system.

On-Line Catalogs

When looking for an item, a buyer can go to such sources as excess property, Federal Prison Industries, National Industries for the Blind or Severely Handicapped, wholesale supply sources [GSA, Defense Logistics Agency (DLA), Veterans Affairs (VA), etc.] Federal Supply Schedules, and commercial sources. If the items controlled by these sources were available through an on-line system, the research time of the buyer would be much more productive.

A system of on-line catalogs for the EC system needs to be developed for all sources of supply. These catalogs should be developed and maintained, based on a standard method, by the controlling entity and should be accessible by all agency buyers through the EC system.

Past Performance

As the government becomes more and more concerned with past performance and awards contracts and small purchases based on "best value," it becomes more necessary to share performance information within the government.

The EC system should provide a shared data base that can be accessed by each contracting office to review the past performance of a particular supplier.

Advertisement of Procurement Opportunities

All nonclassified, nonemergency procurements over the small purchase threshold must be advertised in the *Commerce Business Daily* prior to issuing the solicitation. When the EC system matures and procurements above the small purchase threshold are issued using the system, the "advertisement" of the requirement should be made using the EC system and its posting capability.

The requirement to advertise procurements in the *Commerce Business Daily* should be eliminated if the procurement will be conducted using the EC system.

Agency Systems Requirements

Process improvements for procurement are based on the development of a government-wide architecture to support EC. That core system will facilitate improvements in individual systems currently used in each agency or department. This section identifies specific improvements that each agency should consider when re-engineering its current systems.

Each office must take advantage of the current environment for process improvements through EC. Each agency must form a group consisting of IRM, contracting, finance, and program offices to develop the specific process improvements that are unique to the agency.

One Point of Entry

This improvement provides for a constant electronic flow of information from the requesting office through final payment. Most current systems develop purchase requests manually. These requests are signed by the requester, supervisors, funding/budget personnel, etc. After working through the program office, the request is forwarded to a procurement office where it is placed into some form of a tracking system and processed. There are many advantages to producing the request on an electronic system that allows for connectivity through the program office, to the procurement office, out to the supplier community, back to the procurement office, and then to the finance office. It virtually eliminates the problem of lost transactions and reduces the time

needed to move the request through the "system." Tracking a particular transaction would also be easier by using a single automated mechanism to create and process the request. An RFQ, purchase order, delivery order, or notice of award would be generated without the need to rekey data into various systems. That procedure should greatly reduce the opportunity for errors and the cost of correcting them. Management would also receive more accurate statistical and reporting data on the effectiveness of their office operations.

Linking Program, Contracting, Finance, Receiving, Suppliers, and Inventory Management

Linking agency support systems that transfer data electronically will speed the transfer of this information with fewer errors because fewer opportunities are available for mistakes. Purchase requests can be generated by the program office, processed by the contracting office, and received by the supplier with less human intervention and fewer opportunities for mistakes. Receiving reports, invoicing, and payment can be done faster by eliminating mail time and reducing the number of incomplete actions and, therefore, reducing the need to follow up on these actions.

System Performance of Various Functions

An EC system performs functions automatically and saves time and effort for system users. Program offices are able to check the status of a particular request without trying to locate the buyer and asking status. An EC system can also create an RFQ from the purchase request. After review by a buyer, the system also distributes the transaction to interested suppliers. That action relieves the procurement office of a great deal of administrative burden. The system can also rank quotes from suppliers and highlight the lowest bid to the buyer.

The purchase order is generated with a few keystrokes and distributed to the supplier, finance, and other parties within a matter of minutes. An EC system also helps in the payment of suppliers. The receiving office can electronically verify that an item has been received, and this information forward electronically to the paying office which in turn pays the supplier electronically.

Archiving Transactions

Electronic files of information transactions are needed, whether they represent forms, clauses, letters / memos / notes to the file,

reports, invoices, receipts or other information flows. Here we are concerned with the complete contract/delivery order file as described in FAR Part 4 and a purchase order file, as yet undefined. The archived data must be available to meet a variety of needs, including the need to advertise, award, and administer a transaction; comply with the requirements of law for a written (electronic data are sufficient) copy of each contract; provide contracting officers with access to data that can be used for cost or price comparisons or other pricing actions; provide an audit trail for management control; and be able to answer the public's demands for access to information. Archiving contract files and purchase order files will remain with the agency system and needs to be addressed within each agency.

Official File Location

A buyer needs to keep a "file" of all information associated with a procurement action. Although the requirements for the content and storage of this file vary among agencies, all agencies have some base established. The file contains the solicitation, bids received, winning offerer, and letters to and from suppliers. This file should be located where a buyer has instant access to it. Additionally, the file only need be retained as long as the agency requires. These factors imply the file should be stored on the agency system and not within the EC system.

Administration and Close-out

A number of activities and transactions occur between various entities during the purchase order performance period. For example, buyers may need to meet to discuss current contractual issues and a record to the file of the outcome of that meeting may have to be created to document the file; or a supplier may need to transmit various text transactions such as progress reports or standard forms such as a SF-30, *Amendment of Solicitation/Modification of Contract*, both unilateral and bilateral requirements, or formats such as assignment of claims. In addition, during close-out, an audit of costs claimed must be conducted, and several close-out forms must be executed as part of the official close-out procedure. The reengineered agency system must be able to accommodate scheduled and as-needed documentation for the file. In addition, the agency system should be able to accommodate scheduled terms and conditions within a contract. For example, the agency system should be able to track deliverables, notify the buyer of delivery (i.e., electronic

transmission) or overdue items, and generate delinquency notices automatically or on command of the buyer.

HOW TO EVALUATE PROGRESS

We recommend that appropriate methods be developed to measure the effectiveness of EC in the procurement process. OFPP's FPDC collects basic government acquisition data by fiscal year. Table 2-1 indicates the total number of actions and the dollar value of those actions as well as the socioeconomic data related to actions less than $25,000 for FY92.

Table 2-1. FPDS Statistics. Total New Awards and Modifications—FY92

		%	
		<$25,000	> $25,000
Total			
Number of Actions	19,648,838	98%	2%
Dollar Value (000)	$22,020,118	11%	89%
Socioeconomic Data:			
Number of Actions	9,318,400	47%	
Dollar Value(000)	$8,404,773	38%	

Current experience shows that the processing times for purchasing commodities costing less than $25,000 within the EC world have been reduced, the cost of these goods has decreased, and awards to small business have increased. According to the statistics in Table 2-1, businesses in particular socioeconomic groups have excellent opportunities to increase above the current 47 percent participation when using EC.

Of the 19,648,838 actions for less than $25,000 shown above, 11,457,921 were awarded as small purchases. The remaining number of actions are delivery orders and other procurement methods. Transactions for commodities costing less than $25,000 each require few transmissions (i.e., RFQ, quote and award). However, small purchases for other than commodities, as well as requirements over $25,000, will require a significant increase of activity within the EC system. That activity will include additional and different transaction sets, data elements, and text transmissions. The EC system must accommodate that volume of transactions. These activities will also require an increase in human intervention and interaction with other participating

entities. In addition, the EC system should expect a greater volume of activity at certain times of the fiscal year.

To evaluate the effectiveness of EC in procurement, we recommend the following measurements:

- Number of actions
- Percentage of actions by EDI
- Percentage of purchase dollars by EDI
- Percentage of quotations received via EDI
- Percentage of EDI quotations received requiring buyer information
- EDI procurement administrative lead time (PALT) vs. non-EDI PALT
- Number of active EDI trading partners
- Percentage of active EDI trading partners
- Number of EDI transaction sets used
- Kinds of transaction sets used
- Number of forms (standard, optional, and internal agency forms) converted within EDI.

This discussion of recommended measures and related information can be used as a basis for each agency to consider measures to use for effectiveness of EC. Each agency should review measures already in, or easily obtained from, agency systems and be prepared to recommend and support the best measures. Care should be taken that the measures encourage sound management and cost-effective implementation. OFPP should consider what key measures should be reported at the Federal level.

FINANCIAL

INTRODUCTION

The government financial community strongly supports the establishment of a government-wide electronic commerce acquisition program. However, for the program to be financially successful, existing and future financial systems must support electronic commerce. Furthermore, existing Federal financial

policies and procedures must be modified or updated, where needed, to achieve the potential of electronic commerce.

While the primary focus of this project is to expedite and improve procurement processing actions, collateral financial process improvements are of equal importance to its success. These financial improvements must also be implemented by July 1995, since the Presidential memorandum mandates that there be a full-scale implementation of the "Federal electronic commerce system that expands initial capabilities to include electronic payments, …" Those financial processes that agencies should address include, but are not limited to, electronic receipt and processing of invoices and subsequent payment to vendors through EFT. The entire financial process relating to the procurement cycle should be reviewed and evaluated, particularly those currently subject to manual operation. The areas suggested for review include

- requisition processing,
- budget execution (commitment, obligation, adjustment),
- purchase order processing (obligational accounting),
- invoice receipt,
- receiving report (for internal control),
- purchase order/receiving report/invoice matching and resolution of any administrative differences reflected on the documents,
- payment processing and disbursement (EFT), and
- collections, refunds, and credits.

Each of those areas is part of the full process associated with procurement. These overhead costs can and should be reduced by utilizing EC capabilities and internal agency electronic capabilities wherever possible.

The ability to fully capture the benefits of EC is constrained by common business practices that have their basis either in Federal legislation or governmental accounting and fiscal guidelines, by agency self-imposed restrictions, by the lack of coordination between the government's diverse agencies in the collection and sharing of information, and by the government's inability or hesitance to obtain, embrace, and implement use of the latest technologies quickly. Barriers to full EC efficiencies are

- agency procurement, budgetary, financial, and receiving systems that are not integrated;
- inability of agencies to access other agency vendor information;
- restrictions on the timing of payments for goods and services;
- requirements for an invoice as a precondition of payment;
- inefficient manual payment certification processes that do not provide automated file transfer or warehousing capabilities;
- agency self-imposed controls and limitations on the use of credit cards; and
- current policies which restrict full use of the automated clearinghouse system (ACHS)

Some of the above barriers are the result of legal or legislated precedents and/or Federal financial guidelines for the financial processes related to the procurement process. The ECAT recommends that the legislation or guidelines be reviewed and revised to promote EC. This would require the assistance of the Federal legal community to properly assess these precedents.

The following two recommended revisions would promote EC efficiencies and ensure appropriate continuance of effective management controls:

- Use the flexibility in the Prompt Payment Act to permit disbursements to vendors without submission of an invoice.
- Eliminate invoices or require that, as a minimum, vendors submit electronic invoices as a precondition for EFT/EC-based payments.

PAYMENT PROCESSING

Acquisition and Payment Process

The typical procurement process begins with the identification of a requirement and preparation of a requisition and ends with the final payment to the vendor and completion of budget reconciliation. The "Acquisition/Payment Process" diagram (see Figure 2-2) concentrates on financial activities in the process and depicts the procedure, document flow, and organizational responsibility for each segment.

Figure 2-2 shows that a requisition is prepared by a requesting organization and signed by an authorized program manager. The

requisition is forwarded to the budget office controlling the program manager's funds, where funds are authorized and a commitment is recorded. The funded requisition is transmitted by the budget office to a procurement office where a contracting officer transfers the information to a purchase order, corrects price information, and transmits it to a vendor. The contracting officer also transmits a copy back to the budget office where the commitment is reversed and an obligation recorded. A copy of the purchase order is also transmitted to the finance office for entry of the obligation in the accounting system. (Not shown: A copy of the purchase order is transmitted by the budget office to the requisitioning office to indicate status of the requisition, and it usually has a reminder to complete a receiving report when the goods are received and inspected.)

When the goods are received and inspected by the requisitioning organization, a receiving report is prepared and transmitted to the finance office where it is held with the purchase order. The vendor transmits an invoice to the finance office requesting payment. The invoice is matched against the purchase order and receiving report. If no discrepancies are found, a payment transaction is prepared and entered into the accounting system. If discrepancies are found, the administrative differences are resolved by someone in the finance office. The accounting system then generates a payment transaction and the vendor is paid. The payment transaction information is periodically sent to the budget office to reconcile and adjust any differences in obligations since final payment to the vendor may differ from obligations previously recorded.

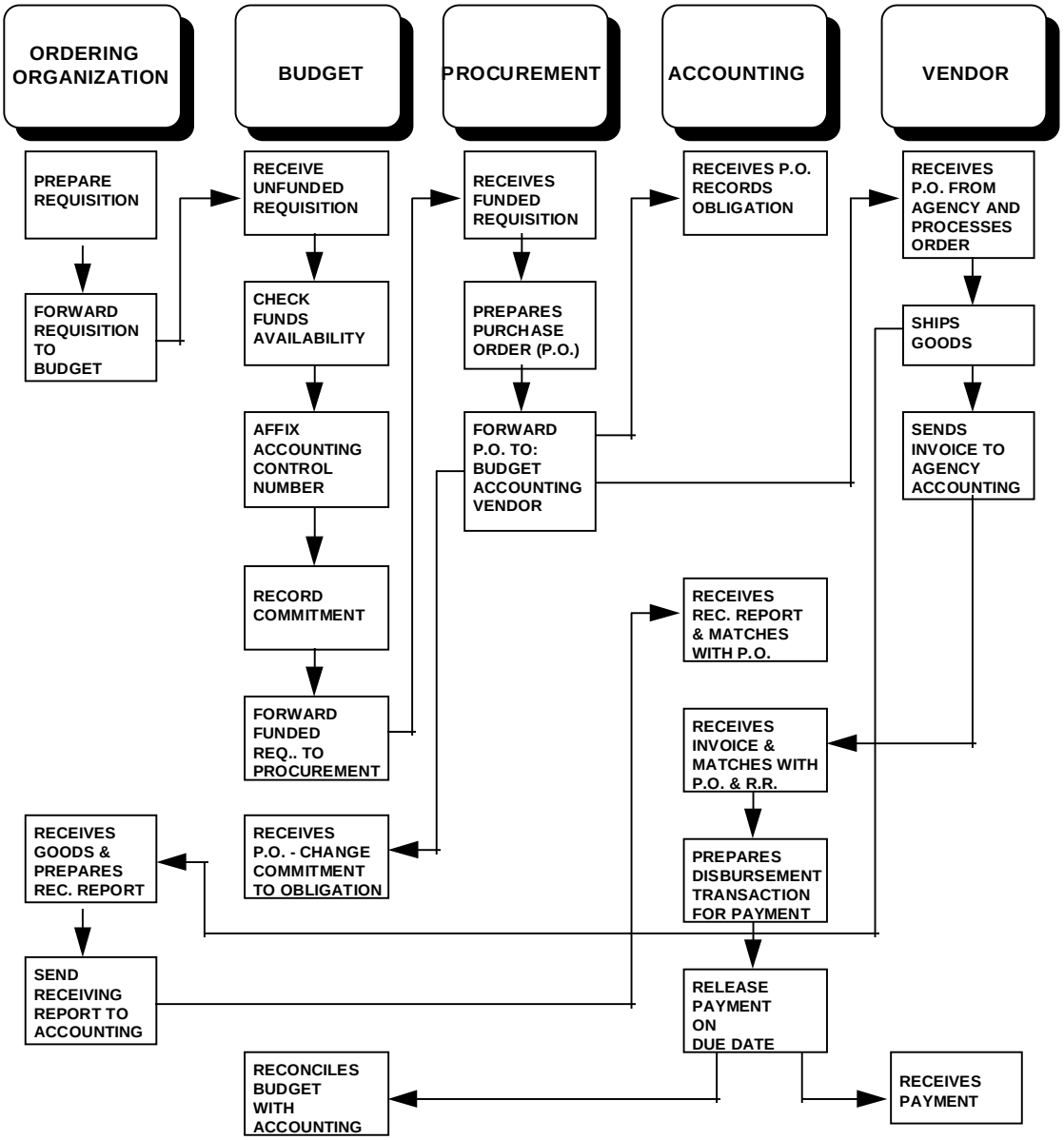

Figure 2-2. Acquisition/Payment Process

Each paper document transfer from one organization to another adds delay and costs to the process. In addition, duplicate data entry is costly and prone to error. Reentry of information is not

only expensive, but also introduces additional potential for future cost by increasing the probability of introducing error.

Procurement and financial systems must be integrated to enable seamless processing of electronic invoices and reconcile invoices, receive reports, and purchase orders.

Systems Automation and Integration

All flows to and from the vendor should, in the future, be accomplished by EDI or EFT. The remaining flows are internal to the agency and should be automated and integrated so that only additional data that add function and value are entered at each step.

Federal agencies are required by the Chief Financial Officer (CFO) Act of 1990 to create and implement a single, integrated financial management system. By definition (OMB Circular A-127), procurement systems are components of that financial management system.

Although some integration initiatives are taking place, Federal agencies' progress toward integrating financial management systems is determined by resource availability as dictated by internal agency priorities. Unless resources are provided and agency schedules for implementing integrated procurement and financially related processing systems are synchronized across the Federal government, much of the potential savings from the EC initiative will remain unrealized.

Agencies must acquire and implement software and tele-communications capability that will integrate the internal agency transmission, receipt, and processing of procurement-related documents as described above.

Reengineering

Process reengineering emphasizes, among other things, the examination of all the steps in a process to look for opportunities to remove or consolidate steps to improve effectiveness and efficiency. As currently practiced in the Federal government, the procurement/payment process is time consuming and highly labor intensive. Even with electronic invoices and automated matching applications, the process involves steps that are redundant, have limited benefit, and generate high costs. The receiving and

payment processes of the procurement/payment process within the Federal government should be reengineered.

In the current process, the receiving organization, upon receipt of goods, must inspect them for acceptability and prepare a receiving report that states specifically what was received. That report is sent to the payment organization where it is held until an invoice is received from the vendor.

The invoice and its handling seem to constitute unnecessary processing and delay. If the government has receipt of accepted goods, why must the vendor request payment and why must the government handle the invoice at all? Many companies, most notably Ford Motor Company and RJ Reynolds, have made remarkable improvements in their payment processing by eliminating the requirement for invoices, and instead, they initiate payment upon receipt of goods. They reengineered their process to provide automated support at the point of receipt, to access the purchase order, and to allow a comparison of the goods received to those ordered. Discrepancies are handled at the receiving point. The result was a sizable reduction in their work forces required for payment processing without any apparent loss of control.

The Federal government can benefit by emulating these forward-looking companies. By concentrating on the receiving function and providing automated support at that point, the government can achieve similar resource reductions. Policies and legislation predicated on the current control procedures must be examined and revised to remove impediments to implementation.

Fast Pay

Current legislation and regulations relating to payment generally require payment within 30 days of receipt of a payable invoice. Delinquent payments are subject to interest penalties paid by the government to the vendor (see the Prompt Payment Act and OMB Circular A-125). Earlier payments are discouraged on grounds relating to good cash management unless they are warranted by offered discounts exceeding the government's cost of capital.

The ECAT financial team has investigated the subject of earlier payments from two perspectives:

- As a possible incentive to vendors to participate in EC with the government.

- As a possible opportunity for eliciting discounts from vendors.

In discussions with government agencies and private enterprises having experience with electronic commerce, the consensus was that the benefits to both parties in EC provide sufficient incentives to engage in EC, and therefore, a faster payment program is not needed for that purpose.

The second perspective would seem to offer an opportunity for considerable savings under a properly managed program. Consider the dramatic decline in discounts offered on payment terms after the passage of the Prompt Payment Act. While the Act has had the intended purpose of providing Federal agencies with a sense of immediacy in paying bills, its unintended consequences were to indicate to industry that there was little advantage to offering discounts. This reasoning resulted from three facts:

- Payment term discounts were no longer considered in price evaluations.
- Agencies were required to pay in 30 days or pay additional amounts in the form of interest penalties.
- Payment processing in most Federal agencies was so slow that vendors knew payment within 30 days was pushing the envelope of expectation. Ten- and 20-day payment terms were not expected by vendors to be incentives for improving timely payment from the Federal government.

With the drop in discounts offered, some agencies that had reasonably efficient payment processes suffered severe reductions in discounts earned. One agency in particular earned enough in discounts to pay for its entire payment processing organization prior to the Prompt Payment Act. Now, while that agency is still earning discounts, the amounts are very small in comparison.

If Federal payments could be made within days instead of a month, the time value of money certainly has the potential of providing vendors with considerable incentive to offer discounts. One only has to look at industry arrangements with credit card companies to realize that guaranteed fast cash payment is the main reason vendors agree to fees they pay for credit card services.

The following is offered as a “straw man” for a fast payment program. Its main features are emphasis on overall payment program management instead of on individual transaction control.

Control is applied at the program level, not at the transaction level. The emphasis is on the effectiveness of the program and management accountability for success, rather than emphasis on individual transaction control and liability for each transaction. Quick payment is initiated at the government's option. The payment manager may elect a number of criteria for deciding to quick pay, including checking the vendor's credit history, checking to see if recurring business with the vendor is normal or expected, and checking whether or not any other governmental agency has had problems with the vendor. (The problem is essentially one that is handled routinely by credit managers in most businesses.)

As the program increases, the savings from discounts earned should offset any losses. Of course, program managers would be held accountable but not legally liable for individual decisions and consequences. A loss attributable to a specific supplier would result in the removal of that supplier from the program.

Since receiving reports would not be a requirement for payment, a notice of payment should be sent to the requisitioning organization requesting they notify the paying office of discrepancies, if warranted.

Full development of the strawman will enhance payment procedures for the Federal government and its trading partners.

Certification Process

The U.S. Department of the Treasury currently provides several options for civil agencies to certify payments. These options include preparation of manual SF-1166 payment schedules typed in optical character reader format and signed by a certifying officer, preparation of a computer tape containing a large volume of payments along with a manual SF-1166 payment schedule summarizing the tape payments and signed by the certifying officer and electronic certification and transmittal of payments through their Electronic Certification System (ECS). With the exception of ECS, options available to agencies require manual certification on paper and the physical delivery of the vouchers or a computer tape to a disbursing center just prior to the date payments are due.

The ECS is a personal computer system requiring reentry of payment information into the system, electronic certification of the payment, and electronic file transfer to the disbursing center. The ECS currently has a 60-payment limitation and uses a 9600-baud

rate transfer speed. In addition, the ECS currently requires manual data entry and approval for each ACHS payment.

The current certification and delivery processes have created a significant burden to accomplish timely payments. Current technology can relieve agencies of inefficient and costly duplicate manual entry and physical delivery of payment information. Creation of a means to transfer and certify large volume payment files and store payments until their due date would centralize the payment issuance process and eliminate redundant agency processes. In addition, inefficient and costly duplicate manual entry and physical delivery of payment information would be avoided.

An electronic certification system must be developed that possesses all of the following capabilities:

- Electronic certification of payment information at the summary schedule level
- High-speed host-to-host computer transfer of payment information
- Large-volume payment processing
- Payment warehousing until its due date.

PAYMENT AND COLLECTION METHODS

Electronic Funds Transfer Payments

The Department of Treasury and the Department of Defense disburse approximately 40 million corporate payments annually using checks and EFT. Electronic commerce offers the government an opportunity to provide an improved EFT program. The government's role needs to be one of providing agencies, banks, and vendors with options that will improve the way the program currently operates.

The EFT program has two components. The first is the transfer of funds from Federal agencies to vendors electronically through the ACHS. The second is the electronic transfer of accompanying remittance information (e.g., purchase order number) that identifies the transaction for which the payment is being made.

Currently, the EFT process begins when a Federal agency procures goods or services from a vendor. The vendor provides the goods or services and submits an invoice requesting payment.

An agency payment order is transmitted to the central disbursing office (FMS or DoD/DFAS) in the form of a proprietary transaction. FMS or DFAS then translates the transaction into a National Automated Clearing House Association (NACHA)-approved ACHS format such as a CCD+ or CTX for processing and settlement through the ACHS network via Federal Reserve.

The Federal Reserve passes the payment and remittance information through the ACHS network to a vendor's bank. The bank credits the payment to the vendor's account, notifies the vendor of the transaction, and provides the remittance information to the vendor. The vendor posts its accounts receivable from the payment and remittance data received from the bank.

In addition to the "standard" EFT payment flow in which remittance and payment flow together, payment and remittance information can be transmitted separately.

Many vendors currently are unable to obtain remittance information from their banks making reconciliation of their receivables very difficult. As a consequence, many have refused payment by EFT. This has been cited as the greatest impediment to increasing the number of EFT payments to vendors. By having the option to separate the payment from the remittance information, vendors will be able to use EFT without changing banks and still reconcile the EFT payments with their receivables. However, because the problem of reassociation of the payment with the remittance advice still exists, the vendor's bank must be able to provide the trace number on the payment record (ACHS credit) received via the ACHS to the vendor. The trace number must also appear in the remittance information provided to the vendor separately.

Electronic Payment Authorization

Another option would eliminate the problem of reassociation because a remittance advice and a payment authorization would be sent to the vendor together using an ASC X12 transaction set 820, Payment Order/Remittance Advice. In Option 3, the two would travel together, not over the ACHS, but through the EDI link between the government agency and the vendor. While settlement will still take place over the ACHS network, the payment would not result in an ACHS credit, but instead would authorize the vendor to send an ACHS debit transaction to the Federal Reserve.

The key concept is "authorization." This is accomplished by an agency sending an ASC X12 transaction set 828, Debit Authorization, to the Federal Reserve. The Federal Reserve must have software that will record the authorization and block any ACHS debits except those matching reported authorized debits.

The 828 to the Federal Reserve and the 820 to the vendor are sent simultaneously. When the vendor receives the 820, the purpose of the payment is known, and the payment portion may be sent by any means to any bank the vendor selects. Any bank can execute an ACHS debit on behalf of the vendor. (As a bonus, the government does not need to know the vendor's bank or account number, nor does the vendor need to keep this information current for government use.)

When the Federal Reserve receives the 828 from the agency, it records a debit authorization and awaits the ACHS debit transaction which is coming on settlement date. Upon receipt of the matching ACHS debit, it is executed.

From a vendor's point of view, this process could be similar to processing a check. From the government's point of view, it would require bullet-proof security features in transmitting the 828 and in accessing the debit authorization monitoring software.

To minimize the number of EFT payments, this option should be examined by Treasury-FMS and the Federal Reserve to remove impediments to implementation.

All government agencies must be capable of making electronic vendor payments. Furthermore, the government must provide agencies, banks, and vendors with options to facilitate participation in EFT.

IMPAC - The Government Credit Card

Background

In September 1986, the National Oceanic and Atmospheric Administration (NOAA) of the Department of Commerce initiated a pilot credit card program under the auspices of the Office of Management and Budget (OMB). Upon the completion of the pilot program, OMB determined the credit card to be an extremely cost-effective means for small purchases and turned the program over to GSA for government-wide implementation. GSA is now

responsible for extending the credit card services to all government agencies.

With the introduction of EC for small purchases, government organizations must continue to use the IMPAC card for small dollar purchases. The use of EFT does not replace the IMPAC card. The IMPAC card's use should be expanded since it is an efficient method of payment.

Currently 679 government organizations are participating in the IMPAC program. From its inception to FY94, it was used for 3.6 million purchases, with an average purchase amount of $275.

Benefits

The government IMPAC program provides the following benefits:

- Worldwide acceptability by vendors
- Immediate access to commercially available goods
- Streamlined procurement process
- Reduced imprest fund transactions
- Reduces imprest fund idle cash on hand
- Improved cash management and payment process
- Refunds
- Timely and thorough management reports
- Audit trail
- Reduced exposure to theft or fraud
- Decreased cost to process numerous payments to numerous vendors if card is used as a payment tool.

Impediments to Wider Use

The main impediment to greater use of the card is agency-imposed internal controls. Federal agencies frequently impose controls in addition to those provided under the GSA contract. While some agency internal controls are necessary to prevent unauthorized use or misuse of the card, many tend to be limiting and hinder usage of the credit card at the agency level.

Another impediment is the limited scope of the IMPAC program. This scope needs to be expanded beyond the view of the credit card as merely a procurement tool. The credit card also has great potential as a payment tool for the government as well, particularly under an EC environment.

Government-wide policies should be revised to reflect the broader possible use of the credit card, to list a broad spectrum of potentially acceptable uses, and to define fully how the card should be used.

The standard purchase order for government procurement also impedes more widespread use of the IMPAC card. Currently, the credit card is viewed mainly as a procurement tool for one-time, small dollar purchases that do not require written specifications. If that view was expanded so that the credit card could also act as a payment tool, the payment of small purchases requiring distinct written specifications could be simplified. The standard purchase order could be revised to include acceptance of the government IMPAC card as a method of payment. The procurement process itself would not change; an RFP and bid and approval process would still be followed. However, once the contract was made and goods were received and accepted, the government cardholder could contact the vendor and authorize payment by providing the vendor with the authorized account number.

Potential Uses

As stated in the GSA procedures for the credit card use, the only prohibited purchases are cash advances, rental or lease of lands and buildings, Federal mandatory telecommunications services, and any procurements that would compete with existing government contracts, e.g., American Express, SF 149 Fleet Management Program, and blanket purchase agreements (BPAs). The credit card has the following potential uses:

- Procurement of recurring services (beeper services, copier services, trash removal)
- Procurement of cable TV transmission
- Maintenance of vehicles not covered under the GSA Fleet Program
- Rental of a block of hotel rooms for conferences
- Rental of large vehicles (e.g., trucks to haul scrap metal)

- Procurement of printing services, either through GPO or commercial sources
- Advance payments such as magazine subscriptions, memberships to organizations, group contracts for fitness centers, and training seminars

Requirements

The percentage of purchases paid by the IMPAC card should be increased. In addition, government-wide policies must be established to expand the scope of the credit card (procurement and payment tool), to list a broad range of potential acceptable uses, and to provide guidance on how the card should be used by individual cardholders and procurement officials.

RECOMMENDATIONS

We recommend the following:

- Establish a government-wide implementation convention for the ASC X12 Invoice transaction set (810) and require that all participating vendors invoice the government electronically. This should be a requirement of the TPA.
- Form a task force to review the entire procurement/payment cycle and recommend alternatives for reengineering current processes.
- Select a team to further develop the fast pay program described as a strawman earlier in this section. Then select an EDI-capable agency to pilot the program as a reinvention laboratory.
- Expand the government's electronic certification capabilities to include high-speed, host-to-host transfer and certification of payments.
- Civilian agencies should eventually send payment order requests to the disbursing offices in 820 format instead of proprietary file formats. In DoD, the entire process is handled by Defense Finance and Accounting Service (DFAS); thus, there is no need for an in-house 820 transaction. The disbursing offices (FMS/DFAS) then generate an ACHS format, either CCD+ or CTX.
- The government should support efforts to help non-EDI-capable banks in delivering payment information to vendors. In particular, the government should support NACHA, which has prepared an RFP for the purpose of identifying service

providers to supply software or network solutions to small banks at a low cost.

- The government should establish a standard implementation convention for ASC X12 transaction set 820.
- Agency collections should be accomplished using EFT when cost effective, practicable, and consistent with current statutory authority.
- Agencies should incorporate provisions in contractual agreements (trading partner agreement, contract, purchase order, etc.) to require the use of EFT as the standard method of collection and to provide the basis for the immediate return of incorrect EFT payments.
- Federal Reserve, NACHA, and Treasury rules, regulations, and operating procedures governing ACHS payments and collections should be reviewed to make them consistent and to remove impediments to the government's use of ACHS collections. Specifically, the ACHS for collections should be expanded to allow agencies to receive ACHS transactions, and a process for returning unauthorized charges against Treasury general accounts should be established.
- The IMPAC card should be included as an optional method of payment for procurements by the government. Since the card is considered a procurement rather than a payment vehicle, that change would be a significant amendment to the objectives of the credit card program. During vendor registration, the government should determine whether the vendor accepts the government credit card.
- The credit card dollar thresholds for procurement officers should be increased to match the upper limits of small purchases.
- Financial management systems should be revised to include features and functional requirements to deal with the reconciliation of IMPAC statements and the proper classification of all purchases.
- The IMPAC account number should be included on the electronic purchase order. The vendor could then receive immediate payment for the goods as soon as they are received.
- Under the future government-wide electronic commerce system, the government should provide the following options for vendors to receive funds and payment information.

- Option 1 (Figure 2-3): Funds and remittance information travel together over the ACHS network via CCD+ or CTX format.
- Option 2 (Figure 2-4): Funds and remittance information travel separately. Remittance information is sent in the form of a transaction set 820 over the virtual network through a VAN, while the settlement will be sent in a CCD+ or CTX format over the ACHS network.
- Option 3 (Figure 2-5): The government should investigate offering authorized debit as a form of payment.

In this chapter, we have described in general the functions of procurement and financial processes and how each would benefit from the implementation of electronic commerce. We have identified the functional requirements that must be satisfied to ensure Federal acquisition will be operated within the context of sound business practices as supported by enabling technology. Accordingly, the following chapters will address in more detail the technical architecture to support a government-wide EC system.

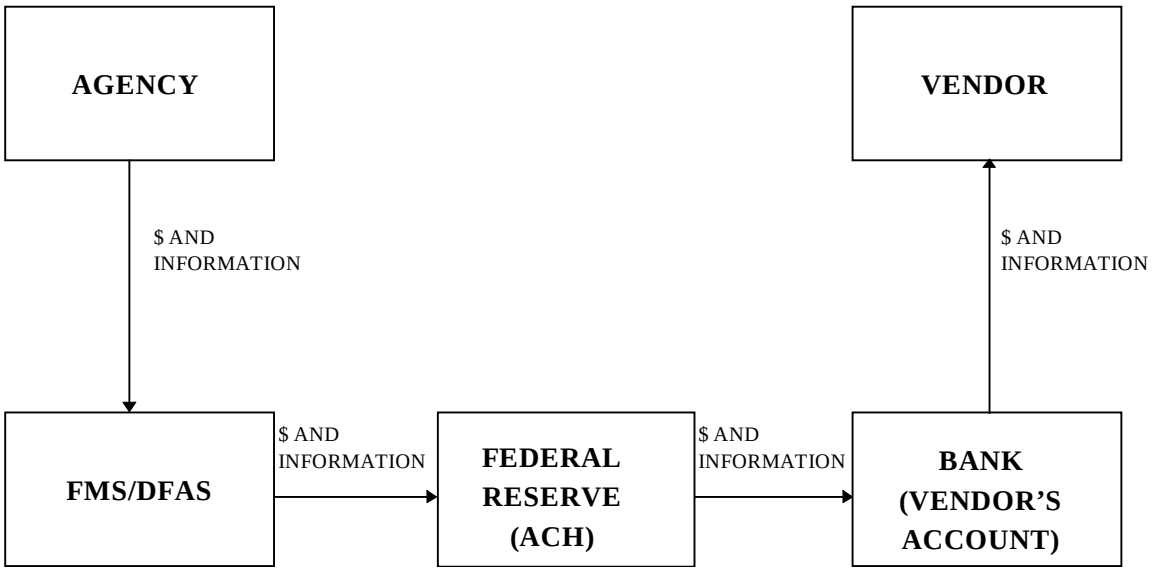

Figure 2-3. Vendor Payment Scheme—Option 1

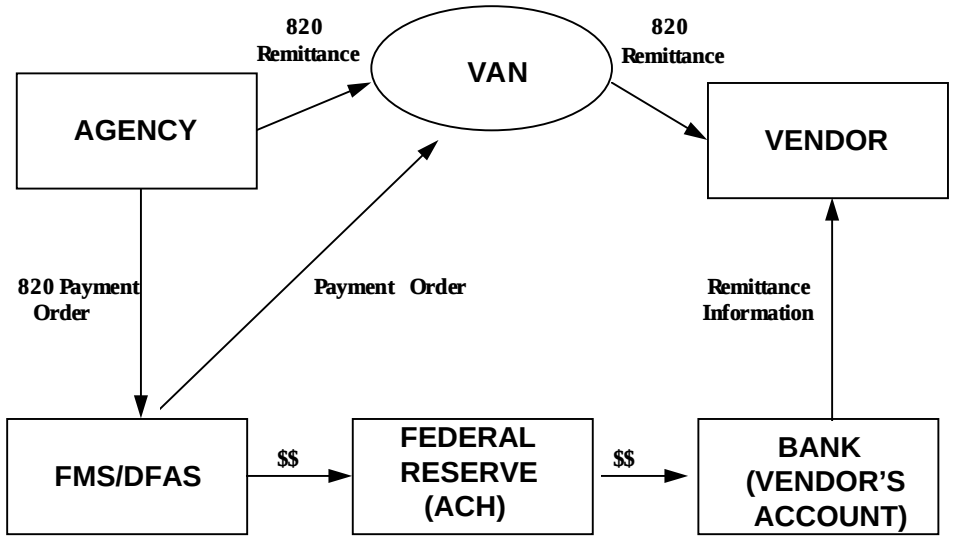

Figure 2-4. Vendor Payment Scheme—Option 2

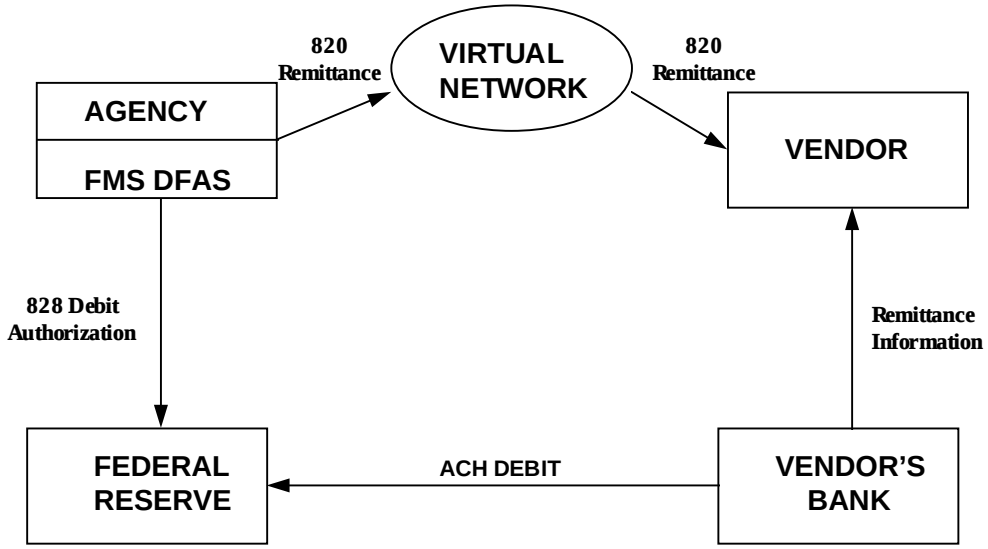

Figure 2-5. Vendor Payment Scheme—Option 3